

Synthesize Residential Buildings Process

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Overview

The purpose of this task is to synthesize an inventory of the residential buildings within the model area, each linked to a parcel. The inventory is stored in a file called ResidentialAllocation.csv.

Data inputs

- 1) Parcel data (ba6)
- 2) 2010 Census block group number of dwelling units

Most of the parcels were coded with one of fourteen Urban Vision (UV) land use types. For residential properties, the relevant codes are HS (Single-family Detached), HT (Single-family Attached), HM (Multi-Family), and MR (Mixed-Use, Residential). Some of the parcels are also coded with the number of units. The parcel data was also coded with an associated Census 2010 block group. While the Census dwelling unit data should approximately match the parcel number of units, there is a lot of variation. The discrepancies are most likely due to problems with the assessor's data used to code the units field.

The Census control total numbers were created by downloading the 2010 Census total number of dwelling units per block group. The distribution of single family and multifamily units came from the ACS 2009 5-year sample distribution. The percentage of single and multifamily units per block group from the ACS was applied to the 2010 Census totals to get a control total by single and multifamily units.

Procedure

In order to synthesize the buildings file, the model team developed the following approach. This approach has been implemented in the draft version of the R allocation script:

- 1) For each block group, use the parcel data for the block group to calculate the total number of HS, HT, HM, MR as well as NA (unknown UV type), VT (Temporary Vacant) and VA (vacant) parcels.
- 2) Use the 2010 Census block group dwelling unit numbers as a control total.
- 3) Sum the number of dwelling units currently coded in the parcel data for the block group. Summarize HM and MR into a category called "MultFam" (multifamily). Summarize "HS" and "HT" into a category called "SingleFam" (single Family).
- 4) Calculate the appropriate number of units to allocate to each parcel. For Single Family this is equal to one. For Multi Family, a distribution of the observed units by block group is used to randomly select the number of units to allocate to each parcel. If there are less than 10 parcels with coded units, then the distribution is created from the parcel's city. If there are less than 10 parcels available for the city, then the county is used, and if the county cannot be used, then the distribution is from the entire model area.

- 5) The script assumes that if a parcel already has a 'Units' value of greater than zero, then it is likely to already contain a building. Therefore, those parcels are allocated the number of units already coded on the parcels. This applies when a Single Family parcel has one or more units coded in the 'units' field. For Single Family, the allocated number is always set to one. For Multi Family parcels, it is included if the number of units is greater than one. Using the number of units already coded in the parcels file results in over-allocation for many block groups. This should be investigated further.
- 6) When the script is finished allocating to all parcels with the correct UV code, it determines if the sum of allocated units is less than the Census control total. If it is not, then the process is complete. If there are still units to be assigned, the script assigns to parcels coded as NA, VT, and VA, in that order. For example, it first tries to assign to all the NA parcels available. When completed, if there are still units to be allocated, it assigns to VT parcels, and then VA parcels. If there are units left after allocating to all VA parcels, then those units are not allocated.
- 7) Multi Family and Single Family both allocate to NA, VT, and VA parcels when there are not enough parcels available. To prevent bias towards whichever type is run first, the following adjustment process is run. In the summary script that is run when the allocation is finished, the duplicated records are flagged and assigned a random number. The parcel with the highest random number is kept, and the other is deleted.
- 8) The end result of the allocation process is that the block group totals are close to the Census control totals for each UV type. One limitation of this process is that if there are not enough parcels of the specified types, the allocated total will not equal the Census total. This should be addressed by analyzing if the current parcel coding is correct. The other limitation of this process is that if the number of units coded onto the parcels is not accurate, then the allocated totals may not be all that close to the Census totals.

There is some additional functionality that could be included in the script but has not yet been implemented:

- 1) There are many block groups where there are no units in the parcel data. Because the process is relying on the number of units, the process could also use other attributes, such as assessed building value or square footage as a surrogate for units.
- 2) The script currently allocates leftover units to all parcels coded as NA. This step could be enhanced by including the zoning of each parcel. Parcels with a UV code of NA and a residential zone classification would be the first priority for allocation. If there are units remaining after allocating to all residential NA parcels, the script would move on to VT and VA parcels with residential zoning.

There are also additional data sources that could augment the multi-family parcel data.

- 1) Condo tables are available for Alameda and Contra Costa counties. These tables could provide a reasonable number of units for the condos in those counties, which would help the multi-family unit calculation.
- 2) The CoStar data contains apartment buildings and could be used to get the number of units per building. The total number of units in this data may not be reliable, so a relationship between square footage and number of units, for example, may need to be created.

Process Validation

A series of summaries were prepared using the allocation output. The following plots show the percentage difference between the allocated totals and the census totals for Single and Multi Family units within the block groups. For Single Family allocation, approximately half of all block groups have a zero percent difference. For many others, the difference is small. The outliers are due to block groups where large numbers of parcels already had units coded, and those units add up to more than Census control totals, or there are not enough parcels to fully allocate the Census control total.

Figure 1: Single Family Block Group Differences

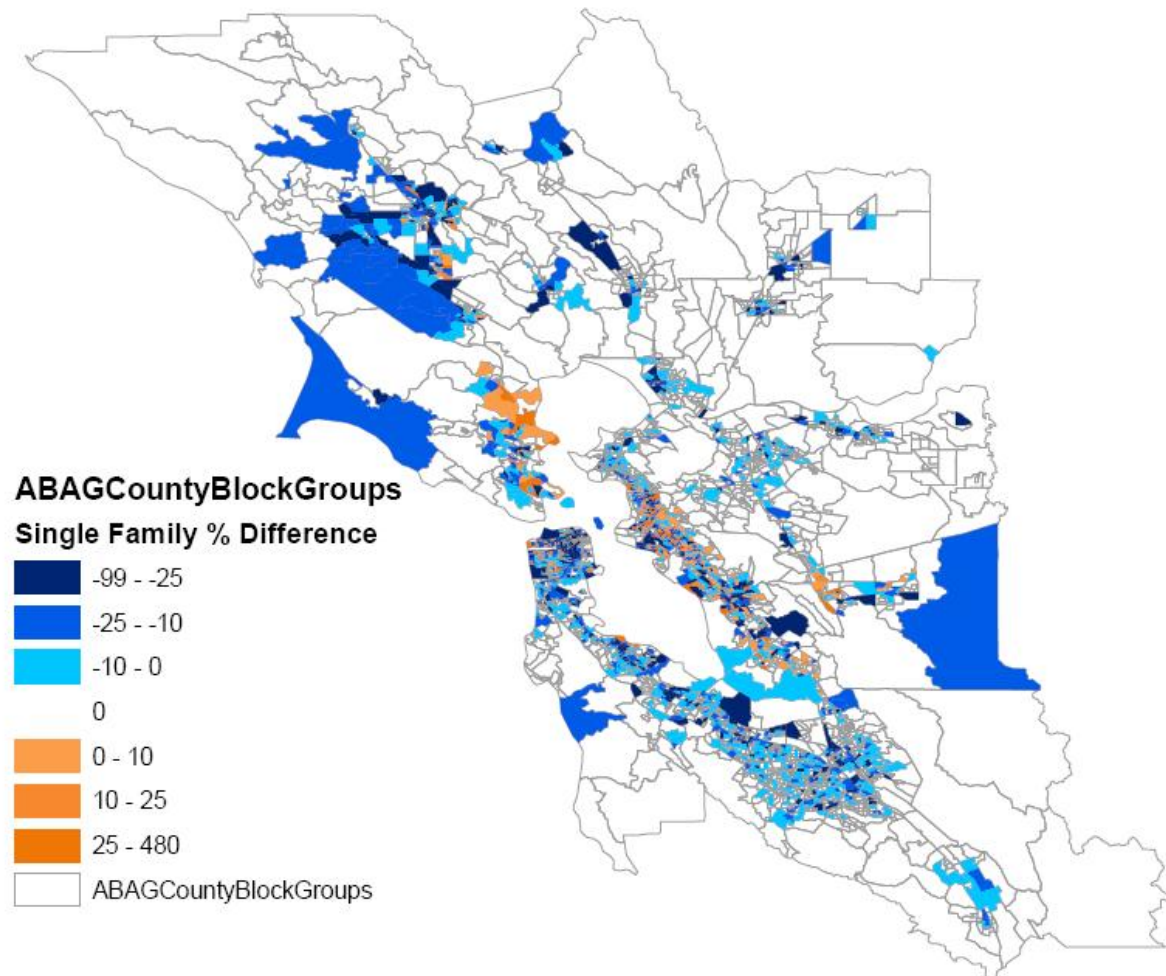
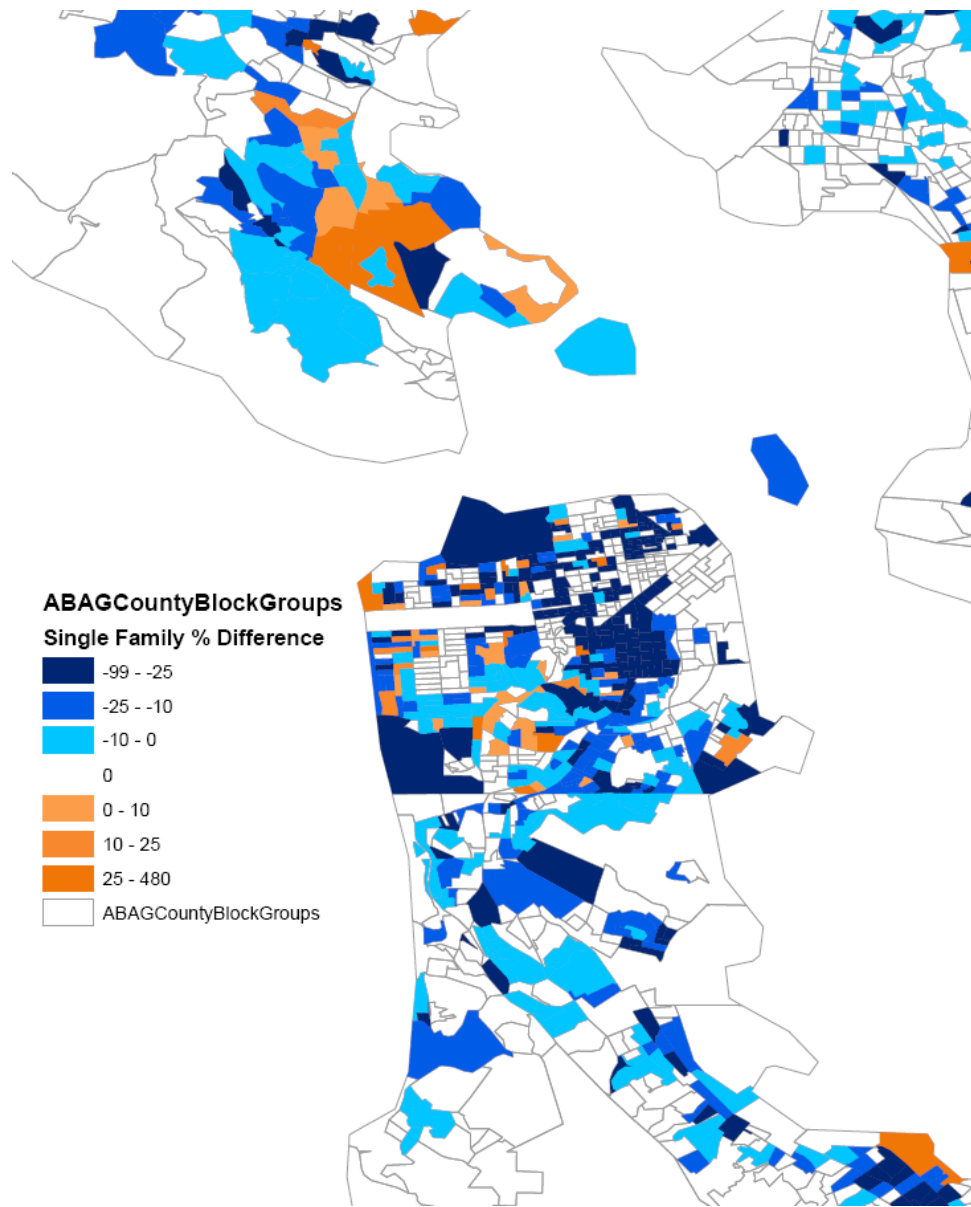


Figure 2: Single Family Block Group Differences, San Francisco Detail



The Multi Family allocation is more diverse, due to the nature of the allocation procedure. There are many cases where the block group total is over-allocated because there is only one Multi Family parcel but it has more units than the control total. For example, there is one extreme outlier, where 374 units were allocated and the control total was only 6. This resulted in an 8000 percent difference. However, in this case the parcel data showed that there were 374 units in at least one parcel, and therefore the script is performing correctly. There is just a large difference between the number of units coded in the parcel data versus the Census data.

Figure 3: Multi Family Block Group Differences

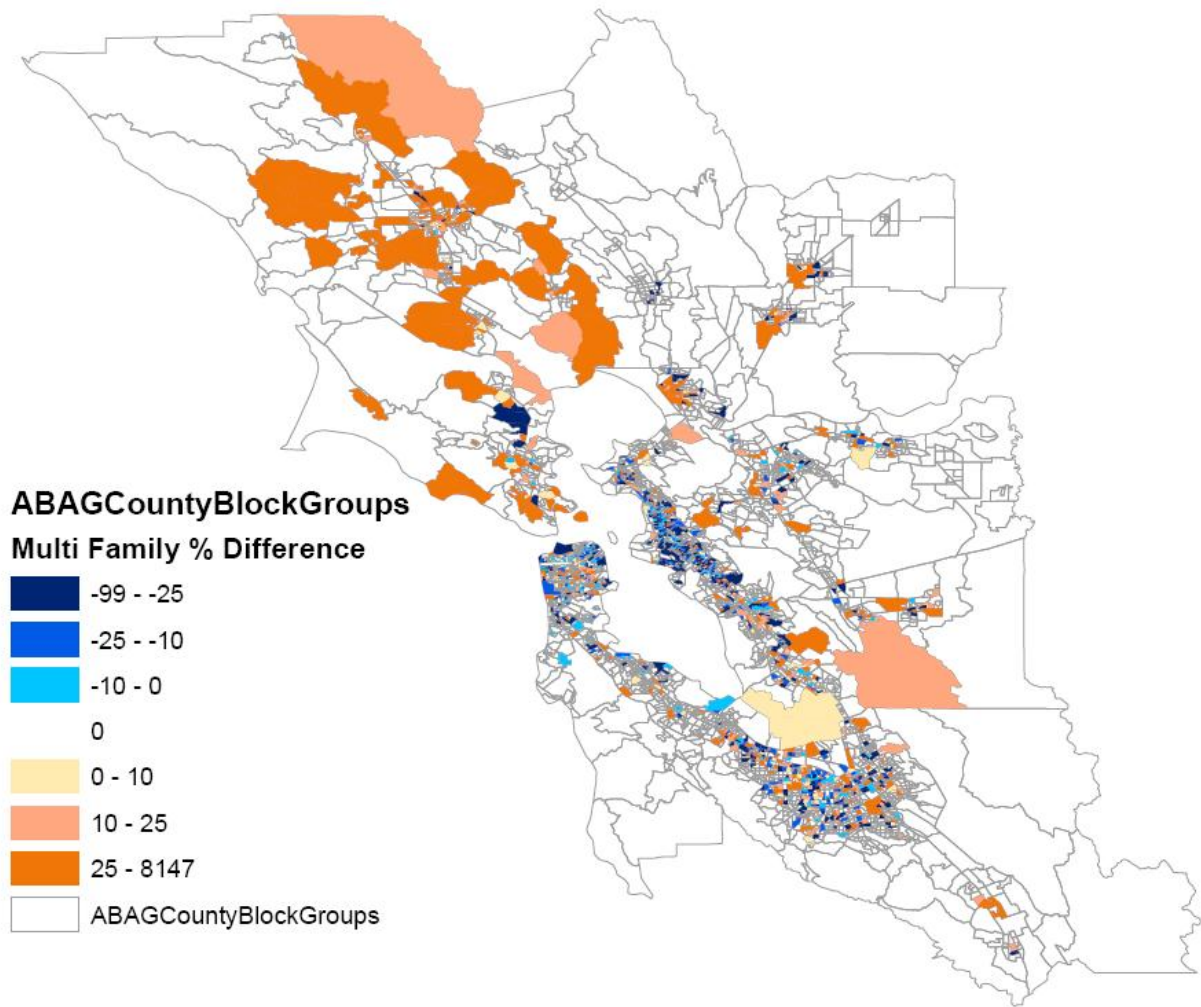
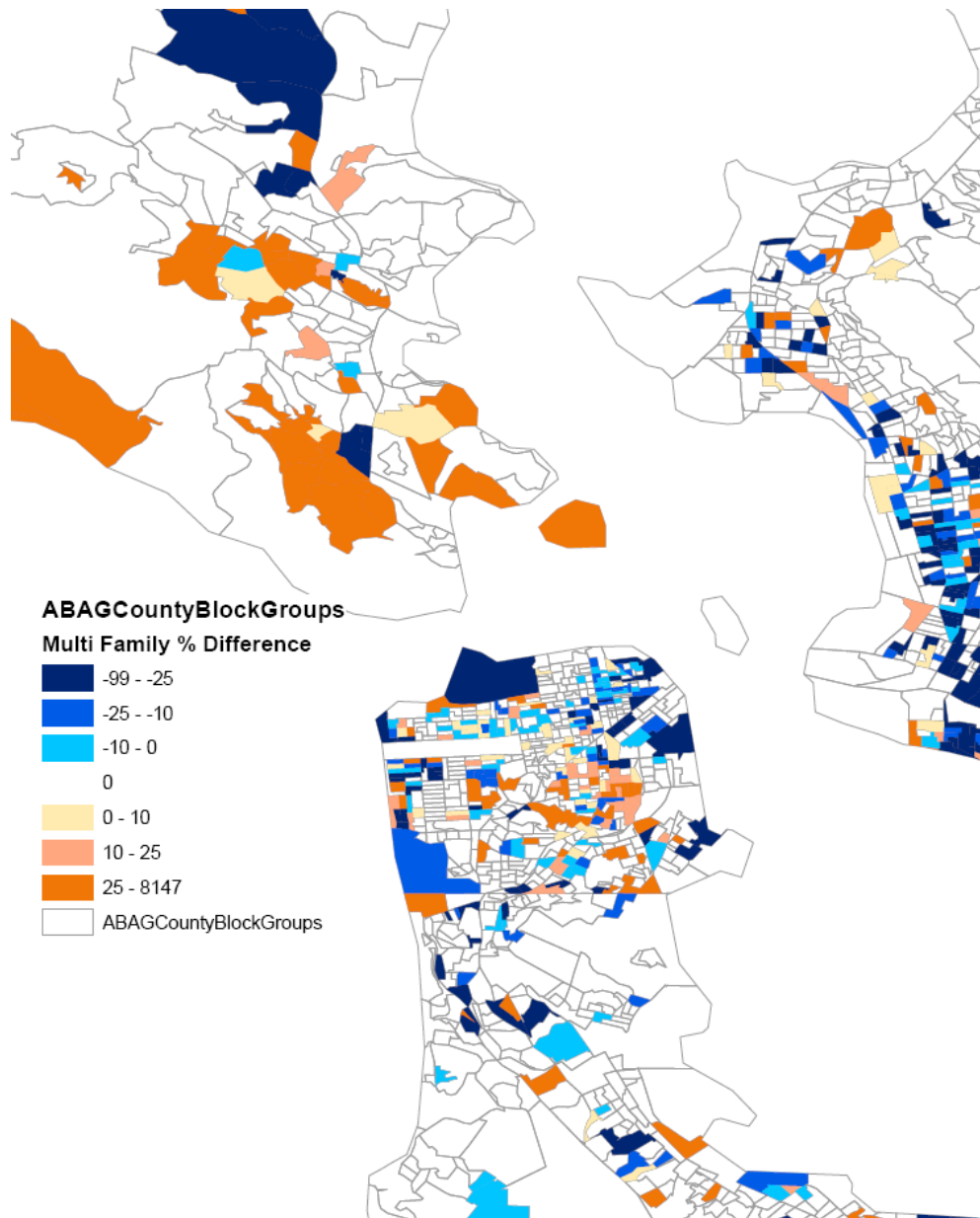


Figure 4: Multi Family Block Group Differences, San Francisco Detail



When the data is summarized to the county level, much of the variation seen at the block group level disappears, as seen in [Table 1](#). In almost all cases, the county summaries show that the allocations are less than the control totals for single family homes. This is likely demonstrating that there are simply not enough parcels for allocation in many cases. While the total number of parcels per county in the table may be larger than the number allocated, in individual block groups there may not be enough parcels to reach the control total.

On the Multi Family side, the allocation totals reflect a similar problem with running out of parcels. However, the differences are not as dramatic in the Multi Family summaries because many units are allocated to each parcel. The Solano County allocation is quite different from the control total, and the

reasons for this are described below. One potential fix to the under-allocation in the Multi-Family records is to scale up the block group results so that they match the control total. For example, if the control total is eight and there are two parcels, then one could be allocated two units and the other four, and each could receive one additional unit in order to match the control total.

The anomaly in the Multi Family allocation is the total allocated for Solano County, which is much higher than the control total. This is caused by the fact that Solano has many units coded on parcels in block groups with much smaller Census control totals. The raw Solano parcel data before any allocation has 151,169 units, even though the Census control total is 34,425. This is a result of some properties such as apartment complexes being allocated a unique puid (parcel) for each unit and the number of units on each parcel being set to the total number of units for the entire complex. This is true for puid 950001165 in block group 60952518021 for example. In this block group, 196 parcels share the same address and each parcel has 194 units. This was also found to be prevalent in other counties as well. This should be fixed in the next iteration of this work. In addition, the process allocated 155,861 units as opposed to the 151,169 units, since there are some block groups that have less units than the control total, and therefore those are allocated additional units.

Table 2 shows the percentage of parcels by county and UV group that already contained units for the allocation process. That means that if the UV type was single family, there was at least 1 unit already coded on the parcel, and for the multifamily type, that there was already at least two units coded on the parcel. The number of parcels that already had units is important because it shows how much work the allocation process had to do. In Napa county, there were so few parcels with any units that it summarized to 0%. For this county, the allocation process did all of the work randomly. In comparison, Santa Clara county had 93% of Single Family parcels already with units and 86% of Multi Family. That means the allocation process only filled about 8% of the total parcels. This is important to consider when evaluating the allocation output, since it is largely reflecting the number of units that were already coded in the parcels data.

Table 1 - County wide summaries

	Parcels Available					Units in Parcel data		Allocated and Control Totals					
	SF	MF	NA	VA	VT	SF	MF	SF Allocated	SF Control Total	% Diff	MF Allocated	MF Control Total	% Diff
ala	332,628	14,640	9,893	3,567	1,926	428,623	161,484	332,216	373,827	-11%	197,921	208,833	-5%
cnc	301,279	4,568	3,977	9,903	12,987	422,105	67,395	281,632	307,105	-8%	95,636	93,146	3%
mar	73,586	5,711	9,053			80,171	25,285	78,875	84,017	-6%	30,709	27,201	13%
nap	35,685	3,116	359	1,248	4,624	0	0	36,281	44,040	-18%	7,986	10,721	-26%
scl	95,358	36,834	9,746			421,562	164,841	102,768	137,250	-25%	218,625	239,692	-9%
sfr	165,240	31,383	11,103	1,394		100,327	193,837	164,799	187,645	-12%	79,441	83,419	-5%
smt	412,954	11,350	8,041	12,182	27	68,853	37,920	384,866	434,777	-11%	190,506	197,177	-3%
sol	117,190	6,290	3,000	5,287	5,391	167,060	151,169	108,748	118,286	-8%	156,512	34,425	355%
son	124,555	17,384	37,418			138,062	51,727	145,982	165,125	-12%	50,064	39,442	27%

Table 2: Percentage of Parcels with Units Already Allocated

	ala	cnc	mar	nap	scl	sfr	smt	sol	son	Total
Multi Family	78%	70%	78%	0%	86%	52%	84%	96%	85%	82%
Single Family	94%	5%	90%	0%	93%	2%	3%	1%	81%	38%
Total	91%	19%	87%	0%	92%	8%	30%	57%	81%	50%

Validation for Selected Block Groups

A sample of 28 block groups was selected to create a summary of the allocated parcels by block group. This sample was used to determine if there were any systemic errors in the process, which were then corrected. The summary tables below show that overall the process is working as specified at the beginning of this memo. The HS and HT parcels were combined as ABAG staff requested. Comparing the total allocated to the available parcels fields shows that in all cases the process is fully allocating the control total. In cases where the control total is less than or equal to the number of parcels available, the process works well.

In many cases there are not enough parcels with the available UV code. Even after combining available HS and HT parcels, this error is showing up in about half of the selected block groups. In these cases, some other classification will need to be made available in order to allocate the entire control total. There is one case with negative difference, which indicates an over-allocation. The over-allocation is because the block group has more units coded on parcels than the control total.

The Multi Family classification works differently, because it allocates more than one unit per parcel. Due to the sampling procedure, it is possible that the number of units allocated will be greater than the control total. This happens when the number of units coded on individual parcels adds up to more than the Census control total. The selected set of block groups shows under-allocation, such as in block group 60855022023, where there were only 3 HM parcels and no NA, VA, or VT parcels to allocate to, and block group 60750308005, where the process allocated to all available parcels and still had leftover units (indicating that there are not enough parcels, as happens for the Single Family units). Over-allocation is seen in block groups including 60411192011 and 60855029104, where the existing number of units on HM and MR parcels was greater than the control total.

Table 3 - Single Family allocation for selected block groups

Single Family	Allocated				Available Parcels								
Block Group	HS+HT	NA	VA	VT	HS+HT	NA	VT	VA	Total	Control Total	Total Allocated	Difference	% Diff
60014001001	1270				1,742	64	0	7	1,813	1,270	1270	0	0%
60014036003	77		4		62	0	0	4	66	99	81	18	-18%
60014083002	420				418	0	0	0	418	426	420	6	-1%
60014305001	687	5			686	7	1	2	696	692	692	0	0%
60014327002	188	1	1	2	188	1	2	1	192	306	192	114	-37%
60014419272	482				548	1	1	0	550	482	482	0	0%
60133132041	543		3	2	543	0	2	3	548	557	548	9	-2%
60133660022	426				454	0	3	10	467	426	426	0	0%
60133690013	192		3	8	192	0	8	3	203	221	203	18	-8%
60411101002	598	38			598	108	0	0	706	636	636	0	0%
60411192011	125	10			125	10	0	0	135	548	135	413	-75%
60552006021	516	19	13	3	516	19	3	13	551	930	551	379	-41%
60552008032	406				436	0	14	3	453	406	406	0	0%
60750229021	55	11			55	11	0	0	66	201	66	135	-67%
60750308005	503	6			503	8	0	0	511	509	509	0	0%
60759806001	79				102	213	0	0	315	56	79	-23	41%
60816004023	204				204	0	0	0	204	209	204	5	-2%
60816105001	82	6	2		82	6	0	2	90	274	90	184	-67%
60855022023	174				171	0	0	0	171	174	174	0	0%
60855029104	167	4			167	4	0	0	171	582	171	411	-71%
60855071001	246	6	6		246	6	0	6	258	333	258	75	-23%
60855110005	431				468	4	0	4	476	431	431	0	0%
60952506011	535	6		3	535	6	29	0	570	544	544	0	0%
60952513001	320			1	320	0	1	0	321	334	321	13	-4%
60952523051	481	64		21	481	64	61	237	843	566	566	0	0%

60952532061	430				546	3	10	0	559	430	430	0	0%
60971511002	484	170			484	170	0	0	654	824	654	170	-21%
60971514023	126	48			126	48	0	0	174	550	174	376	-68%

Table 4 - Multi Family allocation for selected block groups

MultiFamily	Allocated					Available Parcels									
Block Group	HM	MR	NA	VA	VT	HM	MR	NA	VT	VA	Total	Control Total	Total Allocated	Difference	% Diff
60014001001	126					7	0	64	0	7	78	126	126	0	0%
60014036003	1036			65		63	0	0	0	4	67	1101	1101	0	0%
60014083002						0	0	0	0	0	0	0		0	NA
60014305001	148		14			24	0	7	1	2	34	162	162	0	0%
60014327002	111					5	0	1	2	1	9	54	111	-57	106%
60014419272						0	0	0	0	0	0	0		0	NA
60133132041	154			4	12	37	0	0	2	3	42	170	170	0	0%
60133660022	38			59	9	6	0	0	3	10	19	106	106	0	0%
60133690013	158	3			9	21	1	0	8	3	33	170	170	0	0%
60411101002	39		48			14	0	108	0	0	122	87	87	0	0%
60411192011	616					41	0	10	0	0	51	208	616	-408	196%
60552006021	217					185	0	19	3	13	220	217	217	0	0%
60552008032	95					53	0	0	14	3	70	95	95	0	0%
60750229021	259	49				105	28	11	0	0	144	236	308	-72	31%
60750308005	25	68	28			8	19	8	0	0	35	127	121	6	-5%
60759806001						0	0	0	0	0	0	0		0	NA
60816004023	98					9	0	0	0	0	9	98	98	0	0%
60816105001	10		20			4	0	6	0	2	12	30	30	0	0%
60855022023	112					3	0	0	0	0	3	132	112	20	-15%
60855029104	312					3	0	4	0	0	7	24	312	-288	1200%

60855071001	140					14	0	6	0	6	26	115	140	-25	22%
60855110005	208		31			23	0	4	0	4	31	239	239	0	0%
60952506011	55					28	0	6	29	0	63	23	55	-32	139%
60952513001						0	0	0	0	0	0	0		0	NA
60952523051	206		1			7	0	64	61	237	369	207	207	0	0%
60952532061						0	0	0	0	0	0	0		0	NA
60971511002	109	2				65	1	170	0	0	236	8	111	-103	1288%
60971514023	415					26	0	48	0	0	74	415	415	0	0%

Three Block Group Validation

Three block groups from the previous set of 28 were selected to review at an in-depth level. The selection was based on location, so that data patterns could be observed in areas with different types of development. One site was selected in Alameda county, at the edge of the suburban area in the hills, one site was selected in highly residential East Palo Alto, and the third site was selected in downtown San Francisco.

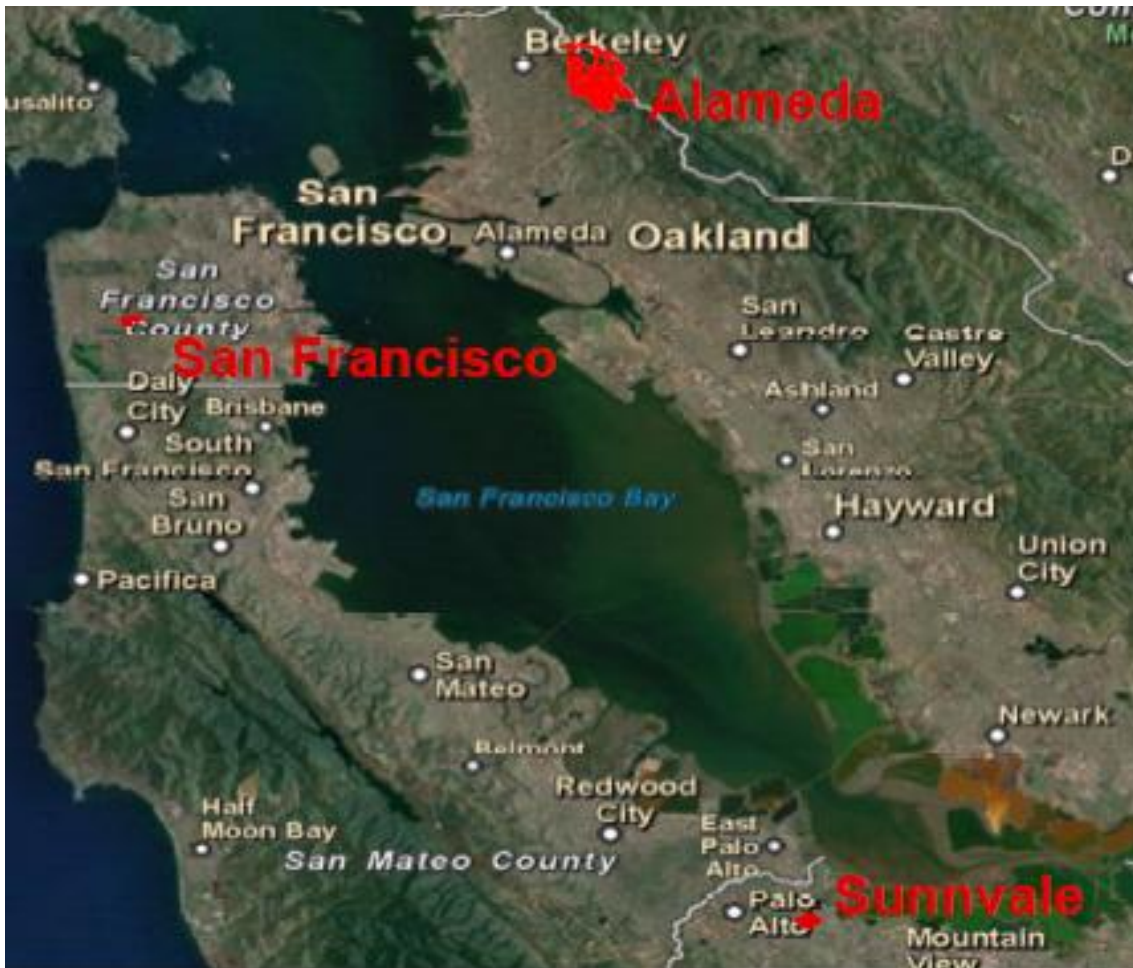


Figure 5: Selected Block Groups

Block group 60014001001, Alameda county

In approximately 20 percent of block groups, the number of units in the parcel file is greater than the Census control total. This is one of those block groups. The investigation of this block group highlights some of the challenges of using this data set.

The table below shows that the total number of units as well as each individual housing unit category is greater than the control total.

Table 5: Selected Block Group in Alameda County

60014001001	Parcel Units									Census Units			
BG	Total	HS	HM	MR	HT	VA	VT	VP	NA	Total	HS	HM	HT
Total	1,821	1,412	7	0	330	7	0	1	64	1,396	977	126	293
Units=1	1,222	920	1	0	301	0	0	0	0	1,253	977	NA	293
Units > 1	32	22	4	0	5	0	0	0	1	7	NA	126	NA
Units = NA	567	470	2	0	24	7	0	1	63	NA	NA	NA	NA

- 1) As shown in the figure below, the block group is located in Alameda County, on the edge of the urbanized area. Many parcels in the block group are undeveloped.

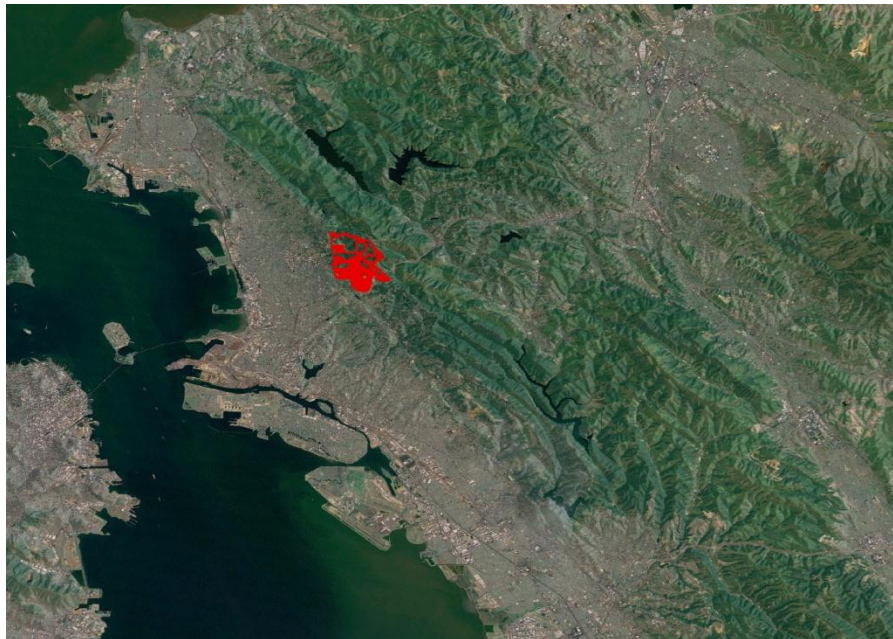


Figure 6: Alameda Location

- 2) Although many units are undeveloped, they were coded with a housing type category in the Urban Vision field. The screenshot below shows an unbuilt neighborhood. If all the parcels with a UV code of 'HS' are counted as a single family home, then the total would be higher than the census totals. Therefore, there is some concern with assuming that all parcels with a UV code other than vacant have a unit on them.



Figure 7: Single family parcels with no buildings

- 3) Analysis of the 'units' field of the parcel database shows that the field is often blank when a parcel is legitimately vacant. However, it is also sometimes blank when a parcel has a dwelling unit, as shown below. However, this is still useful because as the Census control totals can be used to place units on parcels with a designation of 'HS' that do not already have a unit.



Figure 8: Number of units coded on parcels

- 4) Closer investigation of some of the parcels that seemed coded incorrectly reveals that they are parking spaces. In this example, most of these parking structures are coded as VA (vacant), at

least one is coded incorrectly as HS. Also, the parking space that is incorrectly coded HS would be assumed to have a single family home on it. Errors like these are common in datasets that come from assessor's offices. Due to budget and schedule constraints, these errors in the initial data will not be fixed right now. The process for allocation is automated so that it can be re-run in the future if the parcels file is cleaned up.

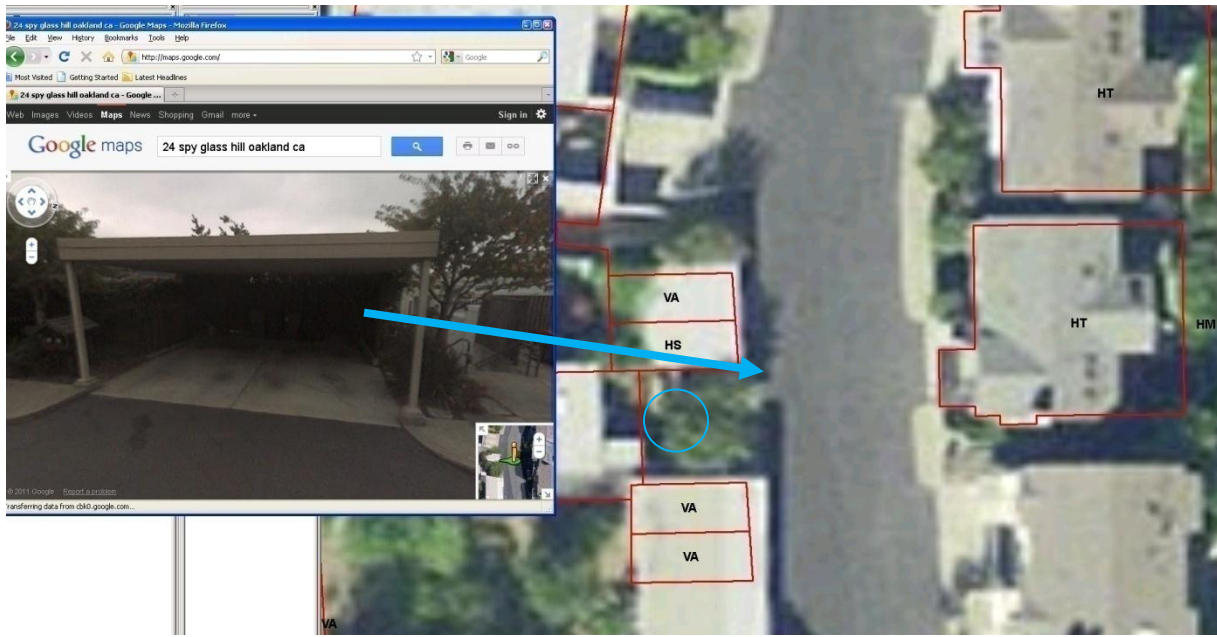


Figure 9: Parking space coded as single family home

- 5) This analysis also points out some larger issues with this data. In the below map, the large parcel in the middle is coded as 'HM.' It 'contains' several small parcels coded as HT, HS, or VA. This is probably reflecting that the large parcel was the original space, and it has been carved out into smaller parcels as homes were built and sold. However, the large parcel itself is coded as 'HM' when it should probably be vacant. It was likely coded as HM because the zoning for the parcel permitted multi-family. However, the site was developed with HS and HT type homes. It is not possible to identify this kind of situation automatically without developing GIS analysis processes that are beyond the scope of this effort. When the allocation script runs, it will assign multi-family units to this 'HM' parcel.



Figure 10: Parcel UV codes

In addition, the aerial image below shows that there are buildings that do not have a parcel around them. This probably reflects that the assessor's parcel set is outdated compared to the buildings that now exist. It is also possible that those are Multi-Family units and therefore the parcel code of HM is correct, but the units look just like the other units on the street and should probably be their own parcels.



Figure 11: Aerial view of parcels

Block group 60855110005, East Palo Alto

- 1) A block group in East Palo Alto was selected as the second site for close investigation. This block is primarily residential, and mostly Single Family homes, with UV codes of HS. From the aerial image in the figure below, it appears that every parcel in this block group contains at least one building.



Figure 12: East Palo Alto block group

- 2) The table below summarizes the number of units by UV classification. In this particular block group, the number of units was not coded correctly for most of the HS units. When comparing the total number of HS to the Census number of HS, the values are very similar. However, when comparing the number of HS parcel with one unit, all the Parcel values are zero. In the case of this block group, summarizing the number of buildings by the units field would not be successful. This is the exact opposite of the conclusions of the previous block group in Alameda County.

Table 6: Selected Block Group in East Palo Alto

60855110005	Parcel Units									Census Units			
BG	Total	HS	HM	MR	HT	VA	VT	VP	NA	Total	HS	HM	HT
Total	499	353	23	0	115	4	0	0	4	664	378	239	53
Units=1	0	0	0	0	0	0	0	0	0	431	378	NA	53
Units > 1	29	0	22	0	7	0	0	0	0	239	NA	239	NA
Units = NA	470	353	1	0	108	4	0	0	4	NA	NA	NA	NA

- 3) Investigating this issue led to summarizing the units field for each county by the number of records that had some number of units compared to the number of records that were coded as NA. These results for the UV category of "HS" are contained in the table below. This shows that

counties generally either have the units field well populated, or they do not. If a county has greater than 90% of the units field populated (Alameda, Marin, San Francisco, and Sonoma), then the 'Units' field can probably be used in the allocation. In the cases where the 'Units' field is less than 6% (Contra Costa, Napa, Santa Clara, San Mateo, and Sonoma), then parcels will be randomly selected for allocation.

Table 7: Units field by county, Single Family homes

County	Units = 1	Units = NA
Alameda	94%	6%
Contra Costa	4%	96%
Marin	97%	3%
Napa	0%	100%
Santa Clara	1%	99%
San Francisco	100%	0%
San Mateo	0%	100%
Solano	0%	100%
Sonoma	95%	5%

- 4) In addition, the number of HM units in the Census is much higher than the number of Parcels HM units, and the number of Parcels HT units is much higher than the Census totals. Perhaps some units that were coded as HM in the Census were coded as HT in the Parcels. Closer investigation of the HT units revealed some ambiguity as to whether or not they are attached units. In the first image below, the units appear to be multifamily. In this next image, however, the units are clearly attached homes.

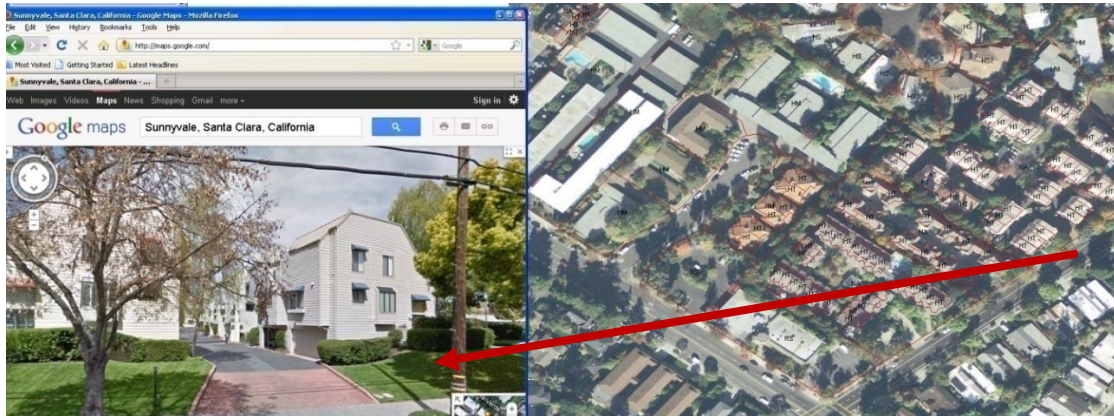


Figure 13: Street view and aerial of HT parcels, 1st location

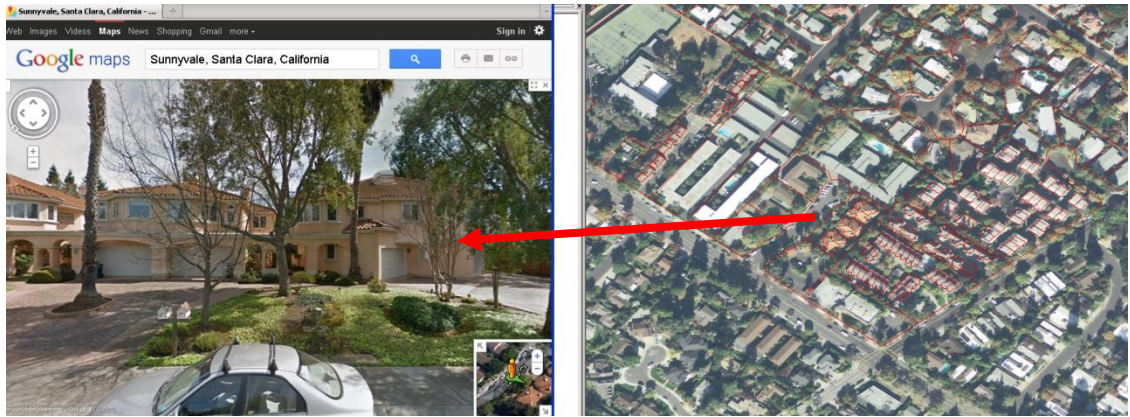


Figure 14: Street view and aerial of HT parcels, 2nd location

In the third image, the units could be attached or multifamily, but it is reasonable that the Census would have considered this a multi-family type of building.

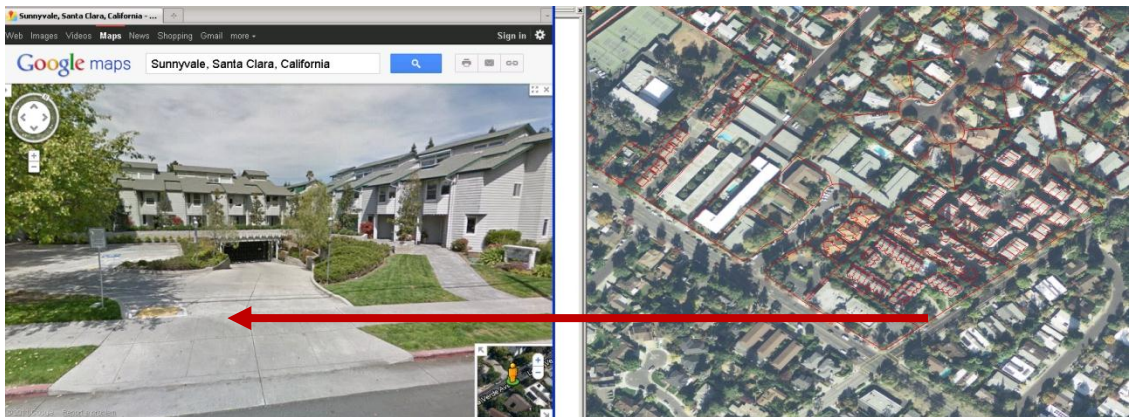


Figure 15: Street view and aerial of HT parcels, 3rd location

Block group 60750308005, San Francisco

This block group was selected because it is in a highly urban part of downtown San Francisco. It is immediately apparent that the Parcels data does not have enough multi-family units. However, there are 19 units coded as 'Mixed-Use, Residential.' These should probably be including as HM units.

Table 8: Selected Block Group in Downtown San Francisco

60750308005	Parcel Units									Census Units			
BG	Total	HS	HM	MR	HT	VA	VT	VP	NA	Total	HS	HM	HT
Total	538	503	8	19	0	0	0	0	8	636	363	127	146
Units=1	509	503	0	3	0	0	0	0	3	509	363	NA	146
Units > 1	23	0	8	14	0	0	0	0	1	127	NA	127	NA
Units = NA	6	0	0	2	0	0	0	0	4	NA	NA	NA	NA

The image below shows one of the MR units. It is a building with a street level business and dwellings upstairs. All MR coded parcels should be treated as HM in our script.

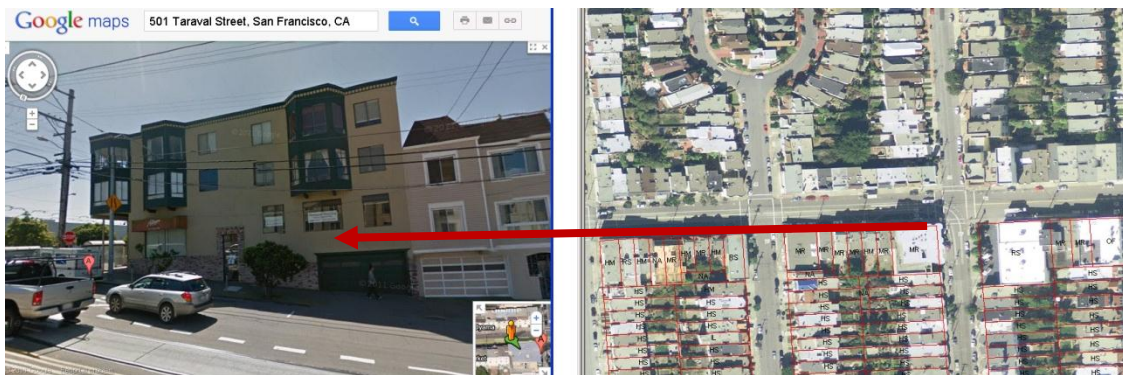


Figure 16: Street view and aerial of MR parcel

This particular block group also has more single family units than the Census, although the Census has many HT units and the parcel has zero. This could be a case of units being classified as HS in the parcels data when they should have been HT.

Investigation of Block Groups with Too Few Parcels

Block group 60014419272 has far more HT parcels than HS, and so the allocation script cannot allocate all HS control total units to HS parcels. Combining HS and HT solves this problem. Additionally, the map below shows that there are parcels for the street, parking spaces, a clubhouse, and right-of-ways that are classified as "HS" (highlighted in blue). There are also a few units classified as HS that are identical to the HT units on either side. This raises some concern for the quality of the UVtype code in the data file.



Figure 17: Aerial view of HS and HT parcels

For block group 60014327001, the script allocates to all the HS and HT parcels and still has 114 remaining single family units to allocate. As shown in the image below (with the block group boundary highlighted in blue), the aerial image and the parcels seem to match up very well, with the exception of parcels along the north edge. There are approximately 50 parcels there, so even if all of them matched to a different block group, it does not explain the full difference between the allocation data and the control totals.



Figure 18: Aerial view of selected block group

Running the Scripts

- 1) Copy all the files in the deliverable to a folder
- 2) Open the scripts in the scripts folder and change the working directory specified in the `setwd()`.
- 3) Run `saveBA6.R` to create a new BA6 file from SQL Server if needed.
- 4) Run `ABAGAllocation_Master_V5.R` to run the allocation process. It will spawn a number of additional R sessions. Make sure R is in the system path so it can be started from the Windows command line.
- 5) When all the R processes are complete, run `SummarizeOutput.R` to merge the results.

Attachments

- 1) `ResidentialAllocation.csv` – output residential allocation file
- 2) `Inputs\ba6.RData` – Parcel file
- 3) `Inputs\ControlTotals.csv` – Census control totals
- 4) `Scripts\ABAGAllocation_Master_V5.R` - main allocation script
- 5) `Scripts\ABAGAllocation_Slave_V5.R` - slave allocation script, called by master script
- 6) `Scripts\GenericAllocationFunctions_V2.R` – allocation functions, called by master script
- 7) `Scripts\SummarizeOutput.R` - allocation merge script, run after the master process completes
- 8) `Scripts\saveBA6.R` – save the R BA6 data file based on a SQL Server query